

THREE NEW MIDDLE AMERICAN SPECIES OF AQUATIC
BEETLES IN THE GENUS *NOTIONOTUS* SPANGLER
(HYDROPHILIDAE: HYDROBIINAE)

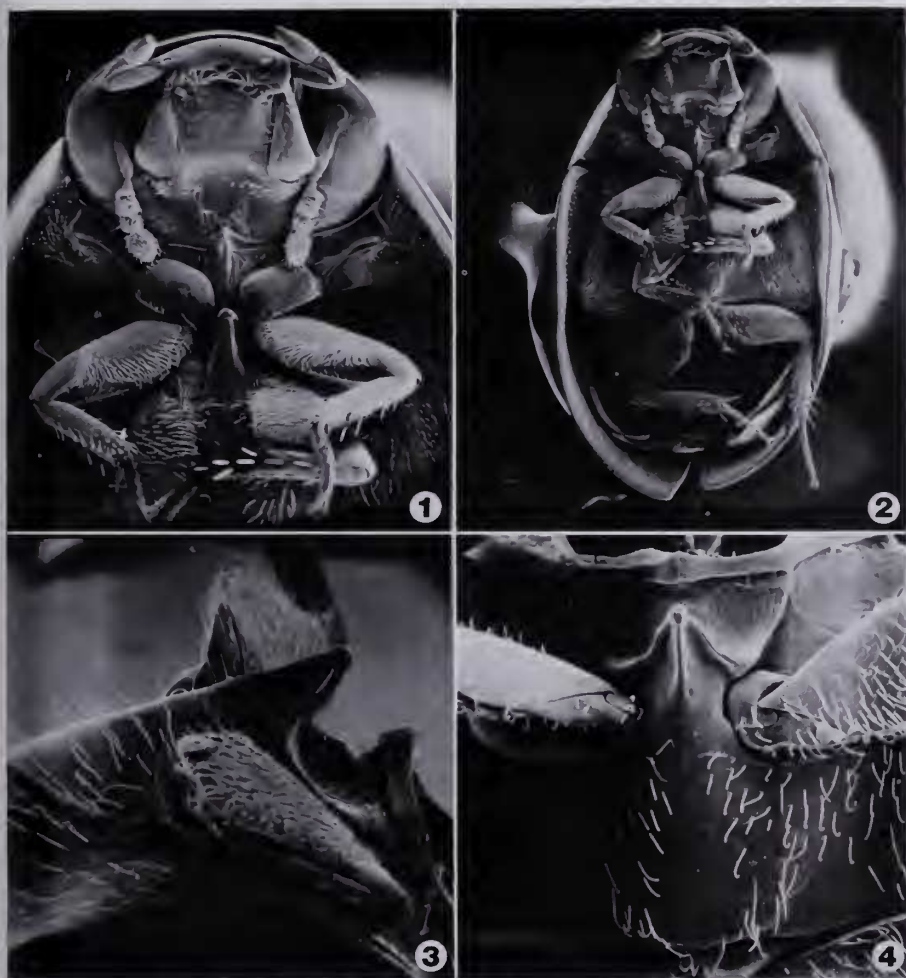
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Abstract.—Three new species of the aquatic beetle genus *Notionotus* Spangler (Hydrophilidae) are described, one each from Mexico, Guatemala and Panama. Shared characteristics of these species which differ from those of the two previously described species from Venezuela are discussed and illustrated with scanning electron micrographs. Aedeagi of the new species, *N. mexicanus*, *N. nucleus* and *N. tricarinatus* are illustrated. Habitat preferences of *N. mexicanus* and *N. nucleus* are discussed, illustrated and contrasted with those of Venezuelan species.

Introduction

The aquatic beetle genus *Notionotus* was erected by Spangler (1972) for two species of Hydrophilidae from Venezuela. Described herein are three new species of *Notionotus* from Middle America, including one species each from Mexico, Guatemala and Panama. Based upon external similarities, these Middle American species form a monophyletic group and constitute the first known members of a lineage which possibly has a sister-group relationship with the Venezuelan species. The three Middle American species have the mesosternum longitudinally carinate in the midline, whereas in the Venezuelan species the median region is flat (cf. Figures 1, 4). The hind femur of Middle American species is more extensively pubescent, having only the apical $\frac{1}{4}$ lacking pubescence, whereas the hind femur of Venezuelan species lacks hydrofuge pubescence in the lower $\frac{1}{2}$ of the midregion as well as apically (Figure 2; see also figure 6 in Spangler, 1972). The front femur of all 5 species lacks hydrofuge pubescence on the upper surface basally, although this region is alutaceous in some (Figure 2, cf. figure 4 in Spangler, 1972). Additionally, the known Middle American species have testaceous elytra in contrast to the Venezuelan species which are either banded basally with reddish brown (*rosalesi* Spangler) or completely piceus (*liparus* Spangler).

There also appears to be differences in habitat preferences of the two putative sister-groups. Spangler (1972) collected the Venezuelan species in macicolous habitats such as "on the wet surfaces of rocks, in crevices, and on leaves in spring seepage areas in road cuts." However, *Notionotus* that my wife Maureen and I collected in Mexico and Guatemala were not found



Figs. 1-4. 1, *Notionotus liparus* Spangler, ventral aspect ($\times 10$); 2, as above ($\times 55$); 3, *N. nucleus* new species, lateral aspect of meso- and metathorax ($\times 230$); 4, as above, ventral aspect ($\times 195$).

in madicolous habitats. Specimens of *mexicanus*, new species, were collected from plant debris which had become trapped between stones in a rapid stream (Figure 8); specimens of *nucleus*, new species, were collected by stirring small stones, gravel and plant debris at the margin of a very small, slowly moving brook in dense vegetation, allowing the disturbed material to drift into an aquatic net, and carefully sorting the contents. My suspicions that *Notionotus* species from Middle America are not strictly

hygropetric are reinforced by the fact that my wife and I collected many specimens of the strictly madicolous hydrophilid *Oocyclus* in several localities in Guatemala and Mexico, but were unable to find a single specimen of *Notionotus* in such habitats.

Key to Species of *Notionotus*

1. Mesosternal process flat or weakly rounded (Figs. 1, 2); pubescence of hind femur less developed, absent from lower $\frac{1}{2}$ of midregion as well as apically (Fig. 2); elytra darkly colored, at least basally; Venezuela 2
- Mesosternal process carinate (Fig. 4); pubescence of hind femur more developed, absent only in apical $\frac{1}{4}$; elytra testaceous; Middle America 3
2. Elytra piceus *liparus* Spangler
- Elytra with reddish brown fascia at base, remainder testaceous *rosalesi* Spangler
3. Head punctation finer and sparser, punctures separated by about 5 times their width; size larger, about 1.10 mm; aedeagus as illustrated (Fig. 5); Mexico *mexicanus* n. sp.
- Head punctation coarser and denser, punctures near eyes separated by their width, others by 3–4 times their width; size smaller, about 1.00 mm; Guatemala and Panama 4
4. Aedeagus as illustrated (Fig. 6); Guatemala *nucleus* n. sp.
- Aedeagus as illustrated (Fig. 7); Panama *tricarinatus* n. sp.

Notionotus mexicanus Perkins, n. sp. (Figure 5)

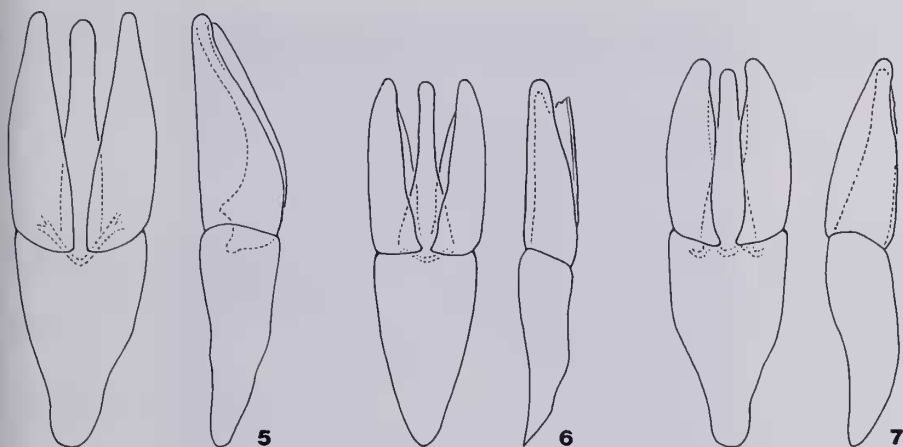
Type-data.—*Holotype* (male). Mexico, Oaxaca, 8 miles E. Tapanatepec, tropical stream with large boulders, 3-VII-1974, M. E. and P. D. Perkins. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratype.—(1 female). Same data as holotype.

Diagnosis.—This species is slightly larger than *nucleus* and *tricarinatus* (1.10 vs. 1.00 mm), has the head punctation distinctly finer and sparser than those species, and differs in aedeagal form (Figure 5).

Description of holotype.—Length 1.10 mm, greatest width 0.65 mm at midlength. Color testaceous dorsally except for brown between eyes and two small black spots near hind margin of pronotum, separated by about $\frac{1}{3}$ width of pronotum; mouthparts, antennae and most of legs testaceous, remained of venter reddish brown.

Head shining, finely sparsely punctate, punctures separated by 5 times their width. Clypeus expanded and shelflike in front of eyes, covering most



Figs. 5-7, *Notionotus* aedeagi, holotypes (dorsal and lateral views). 5, *mexicanus*; 6, *nucleus*; 7, *tricarinatus*.

of labrum, very finely alutaceous along anterior margin. Labrum shallowly emarginate medially. Ventral surface of head finely alutaceous behind eyes and in gular region; mentum shiny, finely punctate.

Pronotum almost 2.5 times as wide as long; punctures finer and sparser than those on head; narrowly margined laterally; anterolateral and posterolateral angles rounded. Prosternum longitudinally carinate in midline, acutely angulate at apex. Prosternal process distinctly produced posteriorly, distinctly separating front coxae; apex concave for reception of mesosternal protuberance.

Elytra convex, narrowly margined laterally; widest at anterior $\frac{1}{4}$, extremely finely sparsely punctate similar to pronotum. Sutural stria absent. Scutellum a small equal-sided triangle. Epipleura almost vertical.

Mesosternum with prominent triangular protuberance whose midline is carinate and on same plane as metasternum. Metasternum smooth and impunctate on swollen medial region, medial region lacking pubescence, adjacent lateral areas with sparse, rather long pubescence; apex of medial region broad between mesocoxae. Abdominal sterna finely alutaceous and moderately densely covered with short pubescence; last segment with a group of tiny golden setae set in small apicomedial emargination.

Front legs with femora pubescent along lower margin in basal $\frac{2}{3}$, upper margin alutaceous in basal $\frac{2}{3}$, apical $\frac{1}{3}$ smooth and shiny. Middle and hind legs alutaceous and pubescent in basal $\frac{4}{5}$, apical $\frac{1}{5}$ smooth and shiny.

Variation.—The single female known has the pubescence at the borders of the swollen medial area of the metasternum shorter and sparser than the holotype.

Distribution.—Currently known only from the type-locality in southernmost Oaxaca, Mexico.

Notionotus nucleus Perkins, n. sp.

(Figures 3, 4, 6)

Type-data.—*Holotype* (male). Guatemala, Alta Verapaz, 5 miles W. La Tinta, small tropical brook, 6-VI-1974, M. E. and P. D. Perkins. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes.—(4 males, 7 females). Same data as holotype, deposited in NMNH and the author's collection.

Diagnosis.—Distinguished from *mexicanus* by its slightly smaller size, more strongly punctate head, and aedeagus (Figure 6). Aedeagal form must be used to differentiate *nucleus* and *tricarinatus*.

Description of holotype.—Length 1.00 mm, greatest width 0.60 mm at midlength. Color testaceous dorsally except for brown between eyes and two small black spots near hind margin of pronotum, separated by about $\frac{1}{3}$ width of pronotum; mouthparts, antennae and most of legs testaceous, remainder of venter reddish brown.

Head distinctly punctate, some punctures near eyes separated by only their widths, others by 3–4 times their width. Clypeus expanded and shelf-like in front of eyes, covering most of labrum, very finely alutaceous along anterior margin. Labrum shallowly emarginate medially. Ventral surface of head finely alutaceous behind eyes and in gular region; mentum shiny, finely punctate.

Pronotum almost 2.5 times as wide as long; punctures finer and sparser than those on head; narrowly margined laterally; anterolateral and posterolateral angles rounded. Prosternum longitudinally carinate in midline, acutely angulate at apex. Prosternal process distinctly produced posteriorly, distinctly separating front coxae; apex concave for reception of mesosternal protuberance.

Elytra convex, narrowly margined laterally; widest at anterior $\frac{1}{4}$, extremely finely sparsely punctate similar to pronotum. Sutural stria absent. Scutellum a small equal-sided triangle. Epipleura almost vertical.

Mesosternum with prominent triangular protuberance whose midline is carinate and on same plane as metasternum. Metasternum smooth and impunctate on swollen medial region, medial region lacking pubescence, adjacent lateral areas with sparse, rather long pubescence; apex of medial region broad between mesocoxae. Abdominal sterna finely alutaceous and moderately densely covered with short pubescence; last segment with a group of tiny golden setae set in small apicomедial emargination.

Front legs with femora pubescent along lower margin in basal $\frac{2}{3}$, upper



Fig. 8. Biotope of *Notionotus mexicanus*, Mexico, Oaxaca, 8 miles E. Tapanatepec.

margin alutaceous in basal $\frac{2}{3}$, apical $\frac{1}{3}$ smooth and shiny. Middle and hind legs alutaceous and pubescent in basal $\frac{4}{5}$, apical $\frac{1}{5}$ smooth and shiny.

Variation.—The 12 specimens studied were quite homogeneous.

Distribution.—Currently known only from the type-locality in southeastern Guatemala.

Etymology.—Latin, *nucleus*, kernel. I refer to the small size, smooth convex dorsum and testaceous color of this species, and also to its distribution in the region known biogeographically as “nuclear” Middle America.

Notionotus tricarinatus Perkins, n. sp.

(Figure 7)

Type-data.—*Holotype* (male). Panama, Canal Zone, Albrook Forest Site, 22-III-1968, R. S. Hutton. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes.—(6 males, 10 females). Same data as holotype, deposited in collections of NMNH, David C. Miller and author.

Diagnosis.—Smaller and with punctuation of the head more developed than *mexicanus*. Aedeagal form (Figure 7) must be used to reliably differentiate *tricarinatus* and *nucleus*.

Description of holotype.—Length 0.98 mm, greatest width 0.55 mm at midlength. Color testaceous dorsally except for brown between eyes and two small black spots near hind margin of pronotum, separated by about $\frac{1}{3}$ width of pronotum; mouthparts, antennae and most of legs testaceous, remainder of venter reddish brown.

Head distinctly punctate, some punctures near eyes separated by only their width, punctures near midline separated by 3–4 times their width. Clypeus expanded and shelflike in front of eyes, covering most of labrum, very finely alutaceous along anterior margin. Labrum shallowly emarginate medially. Ventral surface of head finely alutaceous behind eyes and in gular region; mentum shiny, finely punctate.

Pronotum almost 2.5 times as wide as long; punctures finer and sparser than those on head; narrowly margined laterally; anterolateral and posterolateral angles rounded. Prosternum longitudinally carinate in midline, acutely angulate at apex. Prosternal process distinctly produced posteriorly, distinctly separating front coxae; apex concave for reception of mesosternal protuberance.

Elytra convex, narrowly margined laterally; widest at anterior $\frac{1}{4}$, extremely finely sparsely punctate similar to pronotum. Sutural stria absent. Scutellum a small equal-sided triangle. Epipleura almost vertical.

Mesosternum with prominent triangular protuberance whose midline is carinate and on same plane as metasternum. Metasternum smooth and impunctate on swollen medial region, medial region lacking pubescence, adjacent lateral areas with sparse, rather long pubescence; apex of medial region broad between mesocoxae. Abdominal sterna finely alutaceous and moderately densely covered with short pubescence; last segment with a group of tiny golden setae set in small apicomedial emargination.

Front legs with femora pubescent along lower margin in basal $\frac{2}{3}$, upper margin alutaceous in basal $\frac{2}{3}$, apical $\frac{1}{3}$ smooth and shiny. Middle and hind legs alutaceous and pubescent in basal $\frac{4}{5}$, apical $\frac{1}{5}$ smooth and shiny.

Variation.—Some specimens are brownish dorsally.

Distribution.—Currently known only from the Canal Zone, Panama.

Etymology.—Latin, *tricarinatus*, in reference to the tricarinate mesosternal protuberance.

Acknowledgments

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